User's Manual

DX1000/DX1000N/DX2000 Communication Interface

Notice of Alterations

Please note the following alterations to the IM 04L41B01-17E.

Addition of Functions

The following functions have been added to products of firmware version 1.11 and later.

- A display language of Japanese, English, German, French, or Chinese can be selected.
- 10 s, 20 s, and 30 s have been added to the choices for the retry interval when performing Modbus communciations via Ethernet.

Page 1-31 "• Retry interval"

Set the interval for retrying the connection when the connection is interrupted for some reason. Select Off, 10 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 20 min, 30 min, or 1 h.

Page 3-29 "WU Sets the environment"

Operating Environment

Syntax	.....
p3	Language
	ENGLISH
	JAPANESE
	CHINESE
	GERMAN
	FRENCH

Page 3-35 "YP Sets basic Modbus client settings"

Syntax	.....
p2	Retry interval (OFF, 10S, 20S, 30S, 1MIN, 2MIN, 5MIN, 10MIN, 20MIN, 30MIN, 1H)

Page 6-3 "Modbus Client Function"

Connection retry:	Select the reconnection interval after disconnecting the connection ..... OFF, 10 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 20 min, 30 min, and 1 h

Addition of Functions 2

The following functions have been added to products of firmware version 1.21 and later.

- Function for manually requesting/releasing network information from DHCP.
- Improvements to the Modbus Client function.
- Expansion of Modbus registers.
- Expansion of data output formats.
- Improvements to Service Port settings

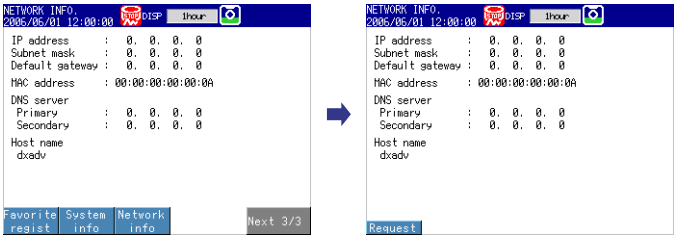
Page 1-7 Addition of Function to "DHCP client"

This function can be used to automatically retrieve IP addresses from a DHCP server. You can also manually request or release network information.

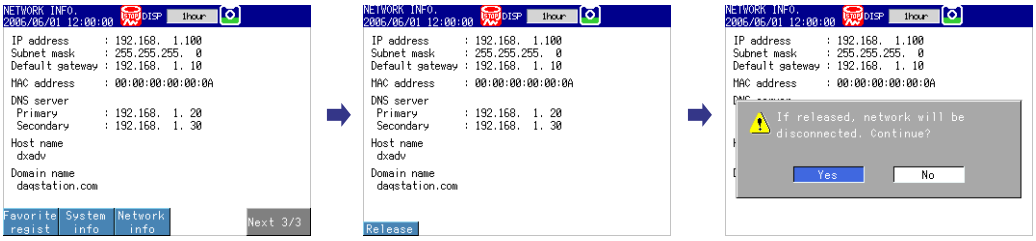
Page 1-11 Addition of “Requesting/Releasing Network Information from DHCP”

You can manually request or release network information such as the IP address. Perform the request or release after displaying the network information screen.

- **Requesting Network Information**
  1. Display the network information screen.
     FUNC key > **Network info**
  2. Execute the network information request.
     FUNC key > **Network info** > **Request**



- **Releasing Network Information**
  1. Display the network information screen.
     FUNC key > **Network info**
  2. Execute the network information release.
     FUNC key > **Network info** > **Release**



Page 1-34 Deletion of “Limitation of ModbusTCP”

- ~~The DX manages ModbusTCP connections using .....~~
- ~~The DX ModbusTCP is a connection-oriented protocol.~~
- ~~The number of connections to the Modbus gateway* is limited .....~~

Page 3-6 Addition of “Output Commands” to Commands

Group Name	Command	Function	Execution Mode	Administrator	User	Ref. Section
Control						
	BO	Sets the byte output order	All modes	Yes	Yes	3.7
	CS	Sets the check sum (usable only during serial communications)	All modes	Yes	Yes	3.7
	IF	Sets the status filter	All modes	Yes	Yes	3.7
	CC	Disconnects an Ethernet connection	All modes	Yes	Yes	3.7
	CB	Date output format	All modes	Yes	Yes	3.7

Page 3-6 Addition of Commands to "3.7, 'Output Commands (Control)'"

CB Data output format

Syntax `CB` `p1`<terminator>

`p1` Output format

0: Standard output (including output of SKIP and OFF channel data)

1: Skip and OFF channel data not output

Description
- This setting is independently set for each connection.
- This command only affects the communication section, and has no effect on the main unit setting panel.
- Valid range of commands

Output details	Corresponding command
Instantaneous data (Binary)	`FD1`, `FF`
Instantaneous data (ASCII)	`FE0`
Decimal position information (ASCII)	`FE1`
Setup channel information (Binary)	`FE5`
Configured alarm information (Binary)	`FE6`

Note

Initialization of BO/CS/IF command settings

- **For serial communications**
  Settings entered using the BO/CS/IF/CB commands revert to their initial values when the DX is reset (when the DX is power cycled, or the user exits the basic setting mode).
  - Byte output order, checksum, output format: 0
  - Status filter: 255.255.255.255

  If you reset the DX, you must restore these settings.
- **For Ethernet communications**
  Settings entered using the BO/IF/CB commands revert to their initial values when the connection to the DX is cut. After reconnecting the DX, you must reenter the settings.

Page 6-1 Comment of "Maximum Number of Connections and Number of Simultaneous Uses"

*3 The default port number. You can set the value in the range of 1 to 65535. Use the default port number unless there is a special reason not to do so.

*4 Make sure that port number settings are not duplicated.

Page 6-3 "Modbus Client Function"

Connection timeout value: 1 min
However, when the IP address is not established with DHCP, a communication error results immediately.

Page 6-5 "Modbus Client Function"

Hold	Register	Data	Data Type
40001	Communication input channel C01	Int16	R/W
|	|		
40060	Communication input channel C60		
	• There is no decimal position information.		
40301	Lower byte of communication input channel C01	Float	R/W
40302	Upper byte of communication input channel C01		
|	|		
40419	Lower byte of communication input channel C60		
40420	Upper byte of communication input channel C60		
41001	External input channel write register 201	Int16	R/W
|	|		
41240	External input channel write register 440		
	• There is no decimal position information.		

Page 1-7 “Log display”

You can display operation logs on the log display. The log can also be confirmed using a communication command. In addition, the Web screen can show the log display (excluding the communication log and DHCP log).

Page 1-22 “• Displaying the log”

Display-s the message summary, ~~communication log,~~ error log, FTP log, login log, Web operation log, e-mail log, SNTP log, ~~DHCP log,~~ and Modbus log in a separate window. .....

Page 2-7 In the figures for “• Four-wire system” and “• Two-wire system”

Terminator (external ~~Built-in: with a switch~~)

Page 2-8 “Terminator”

~~The DX has a built-in terminator.~~ When using a multidrop connection (including a point-to-point connection), connect a terminator to the DX if the DX is connected to the end of the chain. Do not connect a terminator to a DX in the middle of the chain. In addition, ...

Page 3-13 “SW Sets the display update rate/auto-save interval”

The third item of the description under “For the T-Y Display” reads as follows.

• The display update rate (p3) of 15S and 30S can be applied to a high-speed input model (~~see the XV command~~).

The following item has been added to the description under “For Circular Display.”

• A time of one cycle (p3) of 20MIN can only be set on a high-speed input model.

Page 3-21 “SM Sets the custom menu”

The following item has been added to the description under “Set the Main Menu.”

• The SEPARATOR in front is ignored.

Page 3-22

CIRCULAR_KIND Circular type

The following item has been added to the description under “Set the Submenu.”

• The SEPARATOR in front is ignored.

• The Show/Hide setting for the group selection parameters, “G R O U P 1 – G R O U P 3 6” and the auto-switching parameter, “AUTO” are applied universally to Trend, Digital, Bar Graph, and Historical Trend. (For example, after setting AUTO to Hide under Trend, if you then set AUTO to Show under Digital, AUTO will be set to Show under Trend, Digital, Bar Graph, and Historical Trend.)

Page 3-42 “help Outputs help.”

Syntax .....

p1 Command name

(close, con, ~~dump~~, eth, help, ~~ip, mbuf~~, net, quit, ~~reg, tcp, wlog~~)

Upper 4 bits / Lower 4 bits

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0	@	P		p					À	Ð	à	ð
1				1	A	Q	a	q			¡		Á	Ñ	á	ñ
2				2	B	R	b	r					Â	Ò	â	ò
3				3	C	S	c	s					Ã	Ó	ã	ó
4			#	4	D	T	d	t					Ä	Ô	ä	ô
5				5	E	U	e	u					Å	Õ	å	õ
6			%	6	F	V	f	v					Æ	Ö	æ	ö
7			&	7	G	W	g	w					Ç	×	ç	÷
8			(	8	H	X	h	x					È	Ø	è	ø
9			)	9	I	Y	i	y					É	Ù	é	ù
A	LF		*	:	J	Z	j	z					Ê	Ú	ê	ú
B		ESC	+		K		k						Ë	Û	ë	û
C					L		l						Ì	Ü	ì	ü
D			–		M		m						Í	Ý	í	ý
E	CR		.		N		n						Î	Þ	î	þ
F			/		O	_	o					¿	Ï	ß	ï	

German and French only

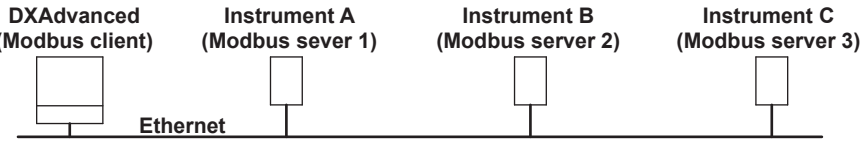
Used for		Command
Tag	Tag	ST
Message	Message	SG
Arbitrary message	Message	BJ
Group	Group name	SX
File header	File header	TZ
Batch text field	Field title Field characters	BH
Batch comment	Comment character string	BU
Four panel display	Screen group name	SY
E-mail	Header 1 Header 2	YU

Explanation of the Modbus Client and Master Functions

- **Pages 1-31 and 2-10 “Examples of Setting Commands”**

  The following are examples of setting commands for the Modbus Client function. For the Modbus Master function, substitute “master” for “client,” and “slave” for “server.”

Connection example



Loading to Communication Input Channel (Communication Input Data)

The DX inputs data loaded from the server to communication input channels as floating point type data.

- **Example 1**

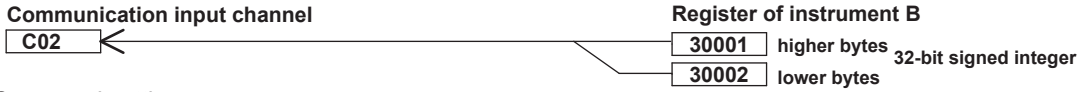
  Load the value of the 16-bit signed integer assigned to register 30001 of instrument A to C01.

Command setting

R-M	C01 - C01	←	1	30001	INT16

- **Example 2**

  Load the value of the 32-bit signed integer assigned to the 30002 register of instrument B to C02. Only the smallest register number need be specified in commands.

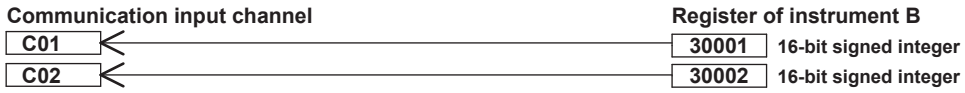


Command setting

R-M	C02 - C02	←	2	30001	INT32_B

- **Example 3**

  Load the values of the 16-bit signed integers assigned to registers 30001 and 30002 of instrument B to C01 and C02. Only the smallest register number need be specified in commands.



Command setting

R-M	C01 - C02	←	2	30001	INT16

Loading to External Input Channels (DX2000 Only)

The DX inputs the data loaded from the server to the external input channel as a 16-bit signed integer type.

- **Example 1**

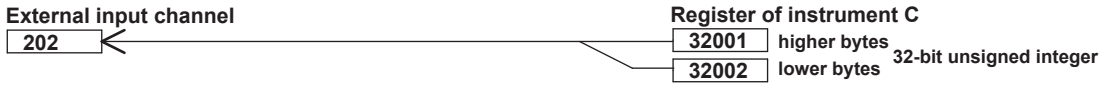
  Load the values of the 16-bit unsigned integers assigned to register 30001 of instrument C to external input channel 201.

Command setting

R	201 - 201	←	3	30001	UINT16

- **Example 2**

  Load the values of the 32-bit unsigned integers assigned to registers 30001 and 30002 of instrument C to external input channel 202. Only the smallest register number need be specified in commands.

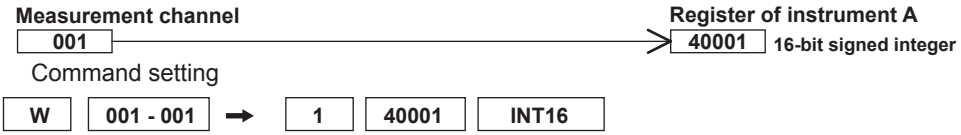


Command setting

R	202 - 202	←	3	32001	UINT32 _ B

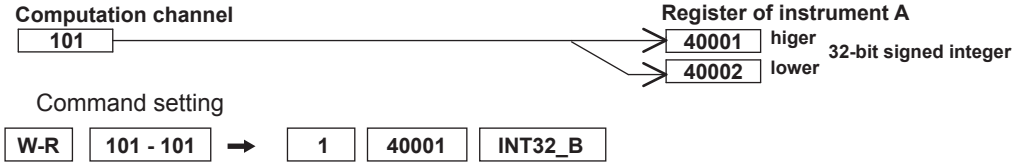
Writing Measured Values to the Server

- **Example**
  Write the measured value (16-bit signed integer) from channel 1 to register 40001 of instrument A.



Writing Computed Values to the Server

- **Example**
  Write the computed values (32-bit signed integers) from channel 101 to registers 40001 and 40002 of instrument A, in the order higher 16 bits/lower 16 bits. Only the smallest register number need be specified in commands.



Page 6-4 “Command setting item:”

Type	Channel	Data Type	Server	
			Register	Register Type
R	External input channel	16-bit signed integer	30001 to 39999, 300001 to 365536, 40001 to 49999, 400001 to 465536	INT 16, UINT 16, INT 32_B, INT 32_L, UINT 32_B, UINT 32_L
R-M	Communication input channel	32-bit floating point	30001 to 39999, 300001 to 365536, 40001 to 49999, 400001 to 465536	INT 16, UINT 16, INT 32_B, INT 32_L, UINT 32_B, UINT 32_L, FLOAT_B, FLOAT_L
W	Measurement channel	16-bit signed integer	40001 to 49999, 400001 to 465536	INT 16
W-M	Computation channel	32-bit signed integer	40001 to 49999, 400001 to 465536	INT 16, UINT 16, INT 32_B, INT 32_L

- **R: External Input Channel Values**
  The range of values of external input channels is −30000–30000 (excluding the decimal point). A +Over or -Over results if this range is exceeded.

Value of Server Register	Value of external inpu channel
Greater than 30000	+ Over
-30000 to 30000	Same as value of server register
Less than -30000	- Over

- **W-M: If the Type of Server Register to Write to Is INT16 or UINT16**
  INT16: A value in the range of −32768–32767 (excluding the decimal point) can be written. If lower than -32768 the value reverts to -32768, and if higher than 32767 it reverts to 32767.
  UINT16: A value in the range of 0–65535 (excluding the decimal point) can be written. If lower than 0 the value reverts to 0, and if higher than 65535 it reverts to 65535.

Computed Value	Server Write Register Type	
	INT16	UINT16
+ Over	32767	65535
– Over	–32768	0
Skip		
Error		
Undefined		
Power failure data		